Analysis of Cancellations at a Cab Portal Company

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Note: While your report should follow this rough format, you may be creative within the sections and present your analyses as you see best fit. We have placed a mapping of all the questions in Part III if you wish to use this structure.

Treat this like a consulting document *you would present to a client. Do not write sentences like "As in Question 1,…", but rather respond using a self-contained description.*

Be sure all visualizations are free of clutter and have good titles that tell the reader what to focus on and understand about the visualization.

If done well, you could use this as a stand-alone document that you can distribute as a writing sample as you apply for different programs and jobs.

Executive Summary

In the given data sample, IndoCabs drivers have an 8 percent cancellation rate, with point-to-point travel showing the highest percentage of cancellations (9.26%), followed by hourly rental (5.52%), and long-distance travel having no cancellations. As evident from the analysis, booking method plays a role: online booking showed a higher rate of cancellation than mobile bookings even though more people use online media. This suggests that improving the quality of online bookings can be beneficial even with similar cancellation rates. There is a weak correlation between cancellations and the day of the week, and the greatest rate of cancellations was on Sunday and Thursday, likely due to weekend demand fluctuations and patterns of trip planning. Similarly, there is a weak correlation between booking time and cancellations, i.e., cancellations do not have a significant impact based on weekend time. But cancellations are closely followed by hourly bookings, which also reinforces that higher volumes of bookings simply translate into more cancellations. There was also a trend for booking windows, where the highest cancellation occurred in short-notice bookings within a day, and bookings over seven days earlier had a declining trend for cancellations. These findings stress the need for IndoCabs to improve its driver allocation control during peak cancellation times, promote early booking using rewards, and modify booking procedures to reduce last-minute cancellations to ensure higher service reliability and efficiency.

Introduction

IndoCabs, an Indian cab portal company, suspended business temporarily due to repeated cancellations that adversely affected customer satisfaction and business performance. The company acts as an aggregator, matching customers with independent cab vendors, but is failing in the reliable execution of bookings due to vendor availability issues and poor demand forecasting. This report aims to analyze cancellation trends, booking patterns, and trip durations to provide data-driven insights that can help IndoCabs optimize its operations and reduce cancellations.

Analysis

A Look at Trip Durations

In analyzing the trip duration and window of booking data, three basic summary statistics were selected to detect central tendencies and variability: median, average, and interquartile range (IQR). For trip duration, the average is 4.05 minutes, and the median is much lower at 1.38 minutes, suggesting that most of the trips are short but with some longer trips that drive up the average. The IQR at 1.74 minutes reveals moderate variability where the middle 50% of trips occur over a limited range. For the booking window, the mean is 1.81 days, and the median is 0.42 days, which suggests that most customers book a little before they're going, but there is a subgroup booking much in advance, resulting in a higher mean. The IQR of 0.79 days suggests a great deal

of variation, i.e., varying booking patterns.

Overall, these numbers show that while most trips are short and of short notice, there are both extremes of trip length and notice period that are distorting the averages. This data can help IndoCabs optimize resource use and manage cancellations more effectively.

Summary Statistics of Trip Duration and Booking Window

	Trip Duration (in minutes)	Booking Window (in days)
Average	4.05	1.81
Median	1.38	0.42
Interquartile Range	1.74	0.79

The Magnitude of the Cancellation Problem at IndoCabs

Out of 2,547 reservations, 210 were canceled. This is an 8% rate of cancellation. While that is not terrible, cancellations impact the company in many ways such as customer satisfaction and operational effectiveness. IndoCabs needs to analyze the patterns of booking cancellations to identify patterns and rectify issues, including peak times for cancellations or specific types of travel with higher rates.

The average trip duration varies significantly by type of travel. Long-distance travel takes the longest average duration at 43.68 hours, and point-to-point travel takes the shortest average duration at 1.55 hours. Hourly rentals are intermediate with an average duration of 6.24 hours.

From Q3, 8% (210 of 2,547 bookings) is the overall cancellation rate. To analyze cancellations across travel types, IndoCabs can see whether certain travel types have higher rates of cancellations. If the longer travels have a higher percentage of cancellations, it could indicate issues with vehicle availability or customer commitment. Similarly, high cancellations in shorter travels could indicate last-minute booking behaviors.

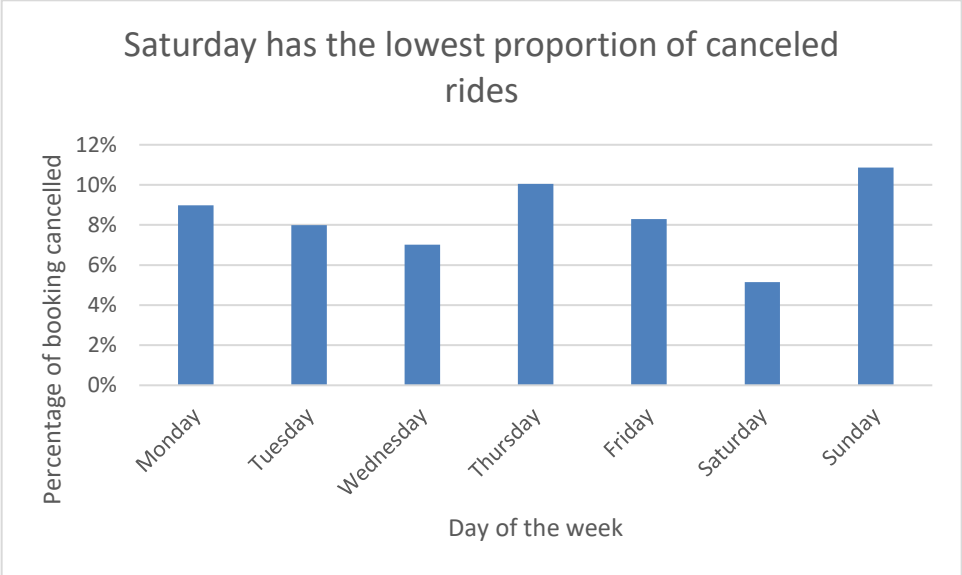
Cancellations by Travel Type

	Number of bookings	Number of cancellations	Percent Cancelled
Long distance travel	89	0	0
Point to point travel	1987	184	9.26%
Hourly rental car	471	26	5.52%

987 bookings were made through one, with 130 cancellations, and 1,560 bookings were made through the other, with 80 cancellations. There is also another division showing 2,405 bookings with 188 cancellations and 142 bookings with 22 cancellations. This suggests a large difference in cancellation rates across booking channels. One channel may have a substantially higher likelihood of cancellations, perhaps due to customer behavior, ease of cancellation, or differences in types of trips. IndoCabs must examine these trends further and consider strategies like incentivizing non-cancelable bookings, tightening policies for high-cancellation channels, or

managing vehicle inventory for channels with higher demand.

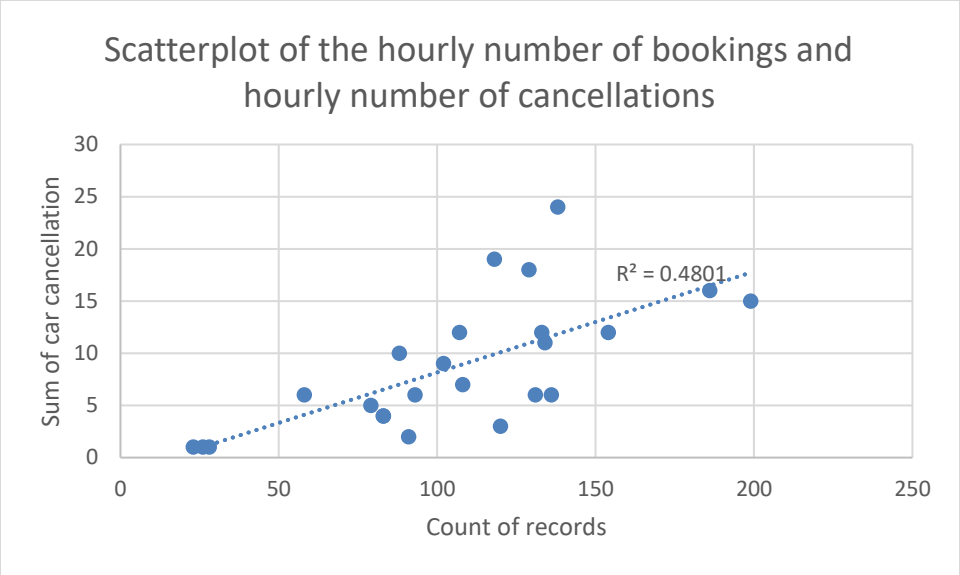
The cancellation rate also varies by weekday, with the greatest cancellation rates for Sunday (11%) and Thursday (10%), and the least for Saturday (5%). The average cancellation rate is 8%. This behavior suggests cancellations occur more when starting and ending the week due to higher demand, urgency for travel, or clashes in timetables. The least number of last-minute re-bookings for a trip can be one cause for fewer Saturday cancellations. IndoCabs must also study customer behavior on peak-cancellation days and find means to curb cancellations, for example, improved cab availability, penalty on cancellation, or reschedule incentives as opposed to cancellation.



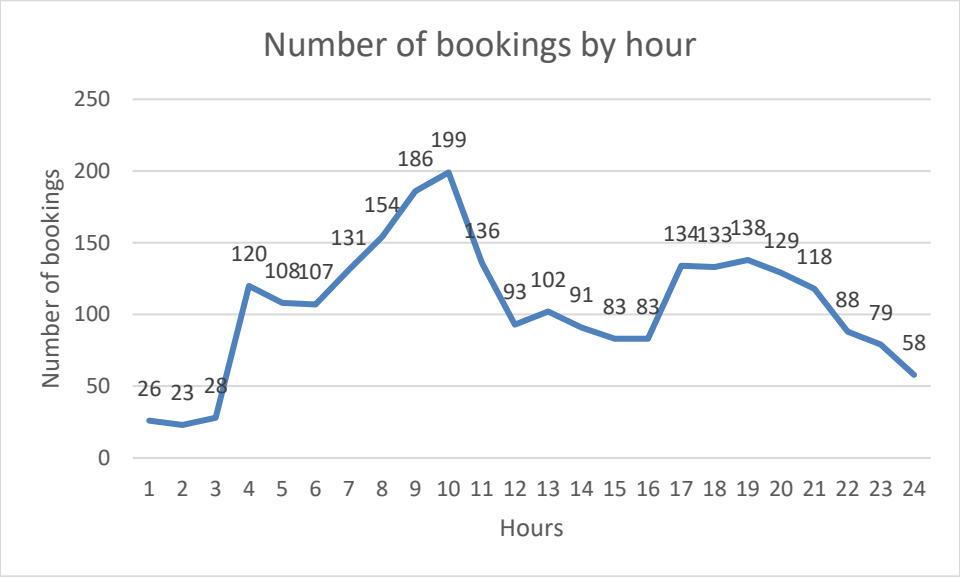
The Relationship between Booking Windows, Cancellations, and Trip Timing

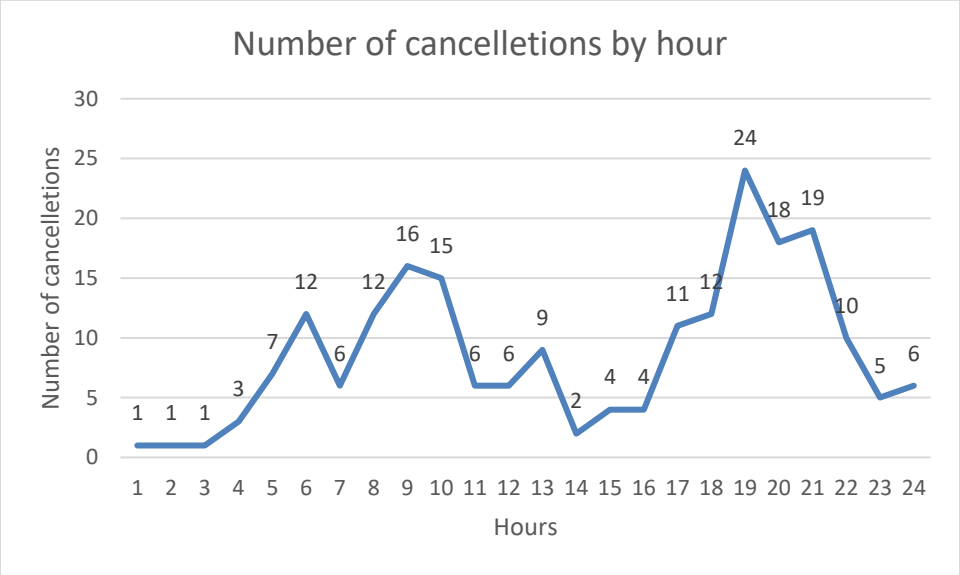
The scatterplot shows the relationship between the hourly bookings and hourly cancellations. The R^2 is 0.4801, which shows a moderate positive relationship between the two variables.

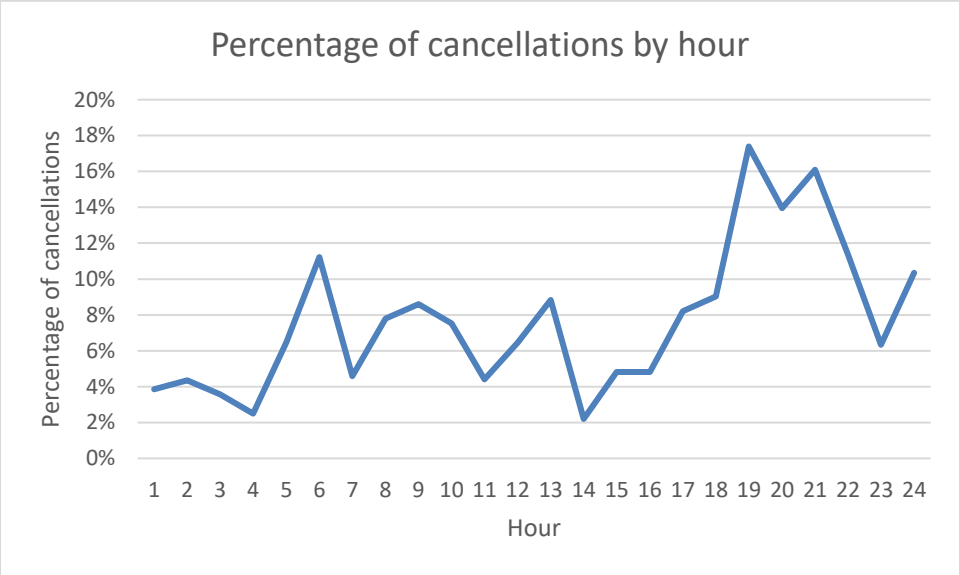
This tells us that bookings rising are followed by cancellations rising too but the relationship is not significant. Perhaps there are other variables, such as time of day, booking channel, or travel type, which may also be influencing cancellations. IndoCabs must explore other variables to find out why people are cancelling and then implement steps to reduce them.



The three-line graphs that follow illustrate significant trends in bookings, cancellations, and the rate of cancellations by hour. The first graph shows that bookings have a high at 9 AM, then decrease steadily up to midday, with a lesser secondary peak at 6 PM. The second graph shows that cancellations closely follow the pattern, with highs at 9 AM and another spiking at 7 PM in the evening. The third graph, cancellations as a percentage of total bookings, however, is the most informative. The raw number of cancellations during peak booking hours is the highest, but the percentage of cancellations as a function of total bookings is proportionately the highest off-peak hours, i.e., 5-7 AM and 7-9 PM. This suggests that while more journeys are being reserved at peak times, a proportionally greater number of journeys are cancelled when demand is lower. What is most revealing about this trend is the fact that it indicates cancellation rates are not simply a product of volume of bookings but may be influenced by other factors, such as driver availability or passenger behavior. IndoCabs can give high priority to understanding why cancellations are disproportionately high at some hours, and this could be used to reduce disruptions.



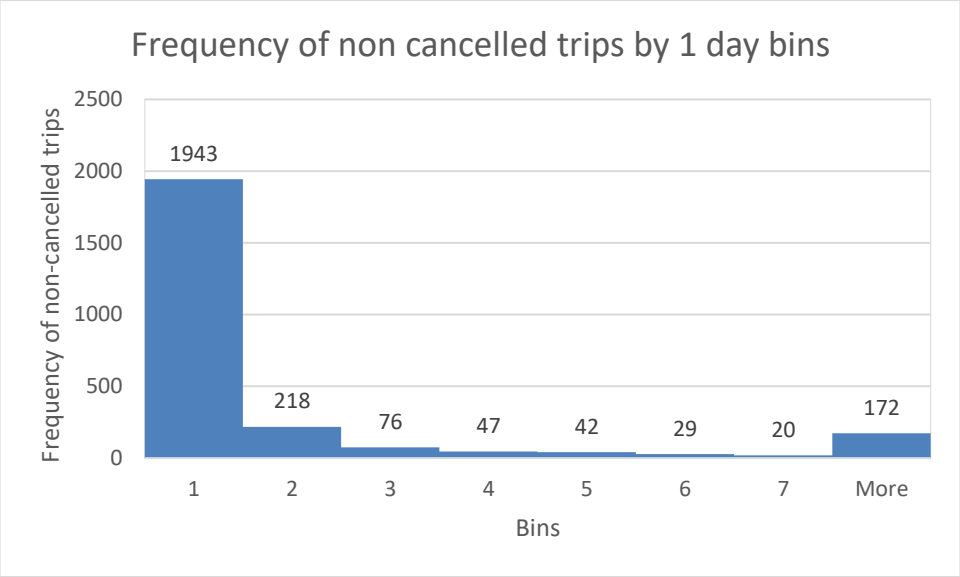


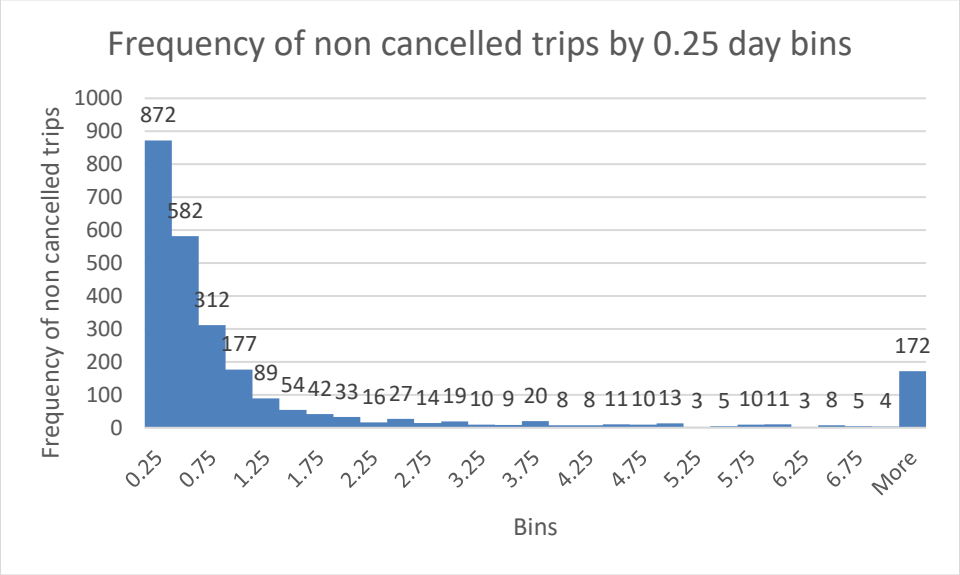


The following histograms reveal significant changes in booking behavior. The 1-day bin histogram provides an overall view that the majority of bookings occur within a day of the trip, with a steep drop-off after that. It shows that IndoCabs is operating in a short-term booking market with customers booking at the last minute. The 0.25-day bin histogram, however, has a more refined breakdown and it shows that many bookings take place within hours of the trip.

The 0.25-day bin histogram is more informative because it indicates the high concentration of very short-term bookings not indicated by the 1-day bins. It is crucial for IndoCabs to identify such trends since it can coincide with high cancellation rates and operational inefficiencies. When a majority of customers book at the eleventh hour, the cabs' availability may become unpredictable and lead to cancellations and customer dissatisfaction. IndoCabs may take measures such as offering incentives for early booking or implementing policies for reducing cancellations based on

bookings at short notice. If the company wishes a rough idea, the histogram for a 1-day bin will suffice, but for more useful details, the analysis by 0.25-day bin is preferable.

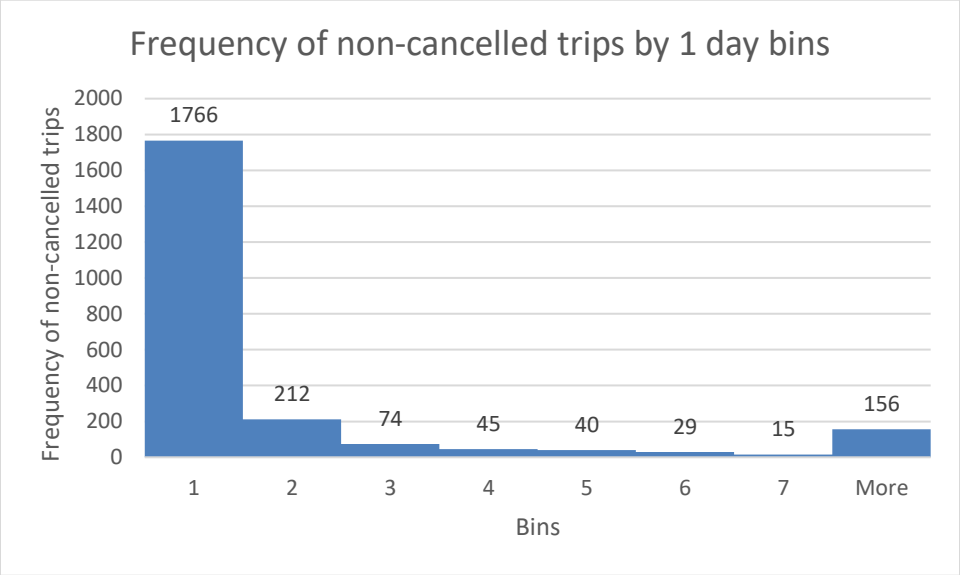


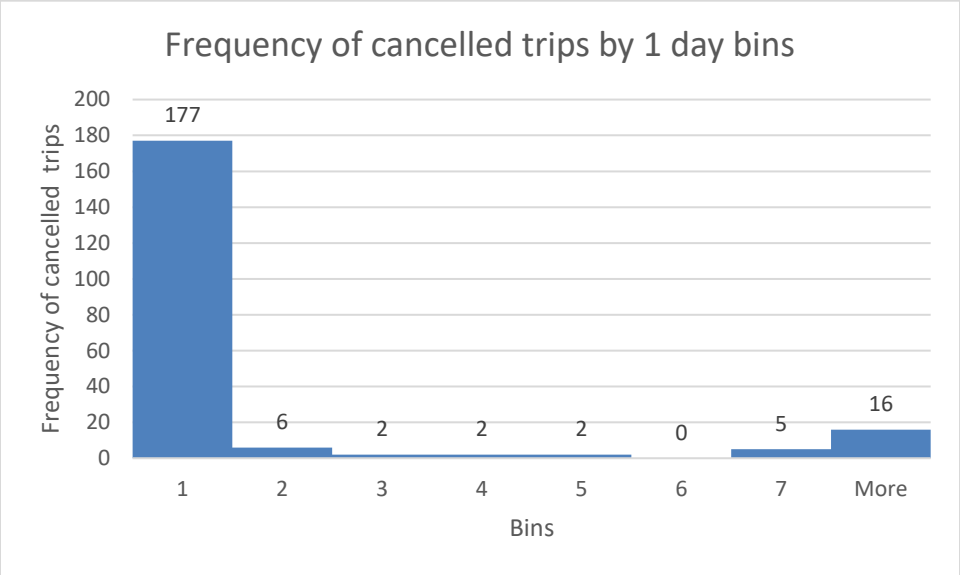


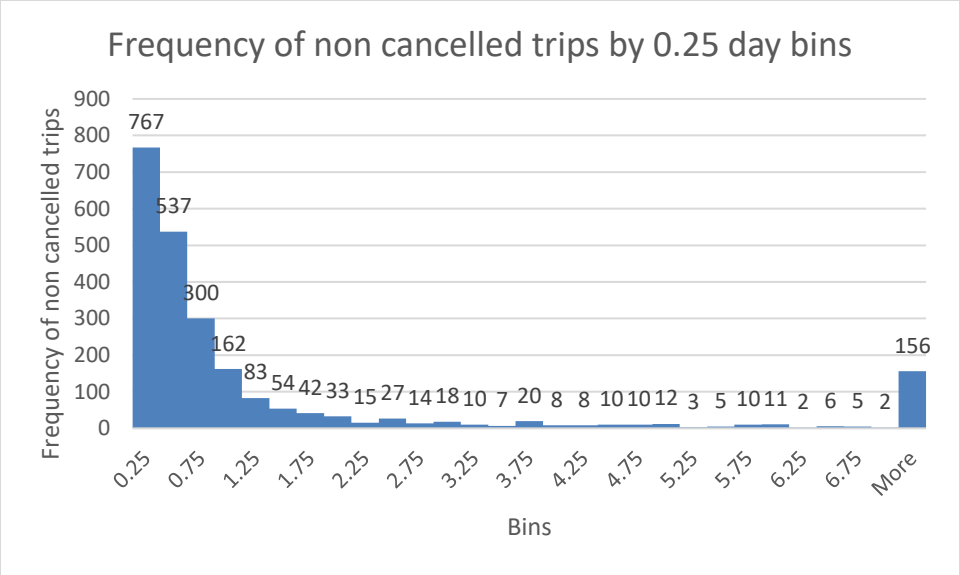
The four histograms below reveal a strong relationship between cancellations and booking windows. Both canceled and non-canceled journeys have most bookings within a day from the 1-day bin histograms, but cancellations fall off rapidly when the booking window is increased. The 0.25-day bin histograms paint a clearer image with a large proportion of cancellations happening for journeys booked just a few hours before departure.

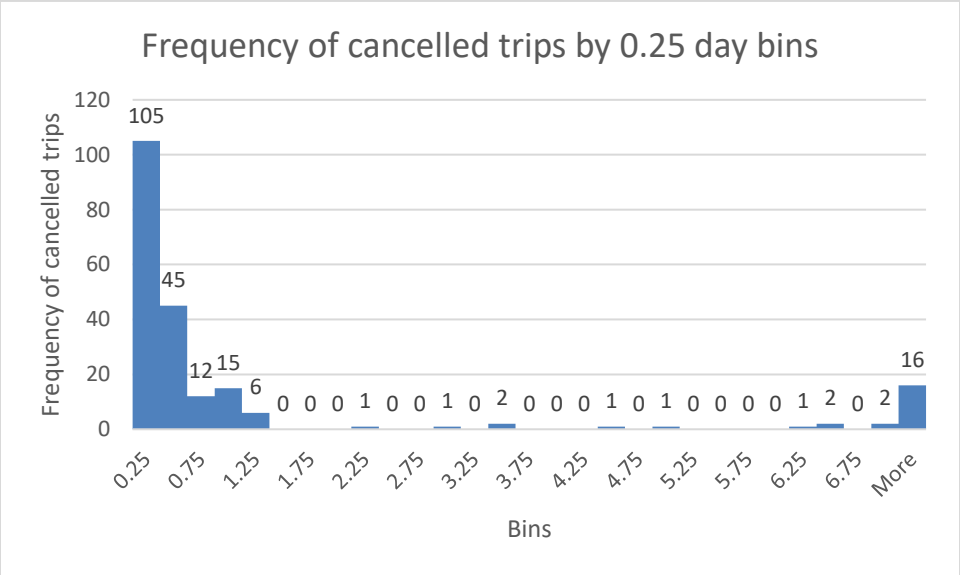
Booking windows seem to influence cancellations, since shorter booking windows have a higher likelihood of cancellation. The 0.25-day bin histograms are more informative because they reveal the concentration of cancellations in very short booking windows, which is obscured in the 1-day bins. IndoCabs would be better off encouraging advance bookings to reduce cancellations

and enhance operational effectiveness.









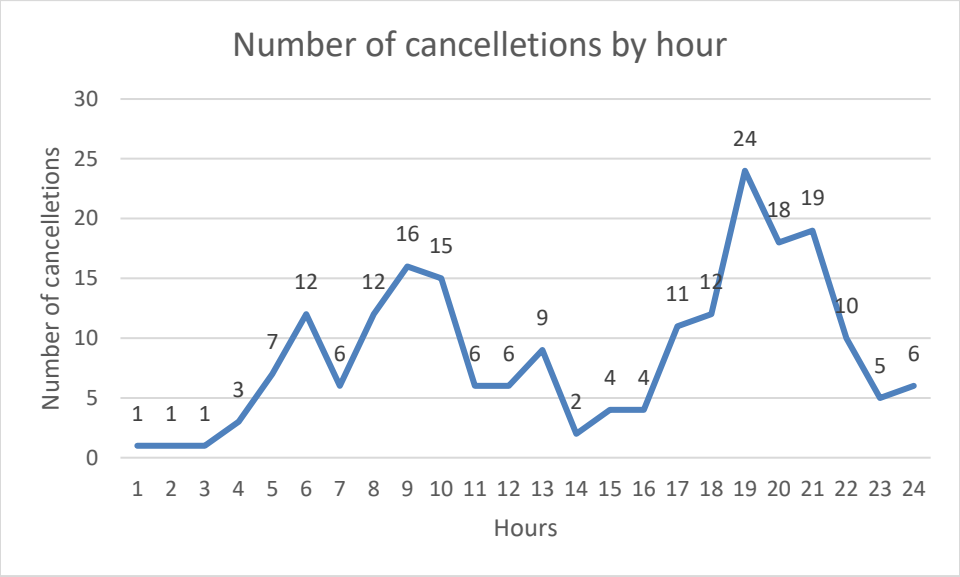
Recommendations and Conclusion

IndoCabs' data analysis identifies key problems in managing last-minute bookings and cancellations. A significant percentage of the trips are booked very close to departure time, and the proportion of cancellations among such short-notice bookings is disproportionately high. To deal with these issues, IndoCabs need to reward advance bookings with benefits such as reduced rates or loyalty points for advance-booking passengers. Imposing stricter cancellation fees, particularly on peak-hour timings, could help to deter last-minute cancellations and enhance more effective use of resources. Cab allocation according to demand patterns is also crucial as cancellations occur in certain peak periods and types of trips. Dynamic supply adjustment of vehicle availability would help IndoCabs match supply more closely with authentic demand.

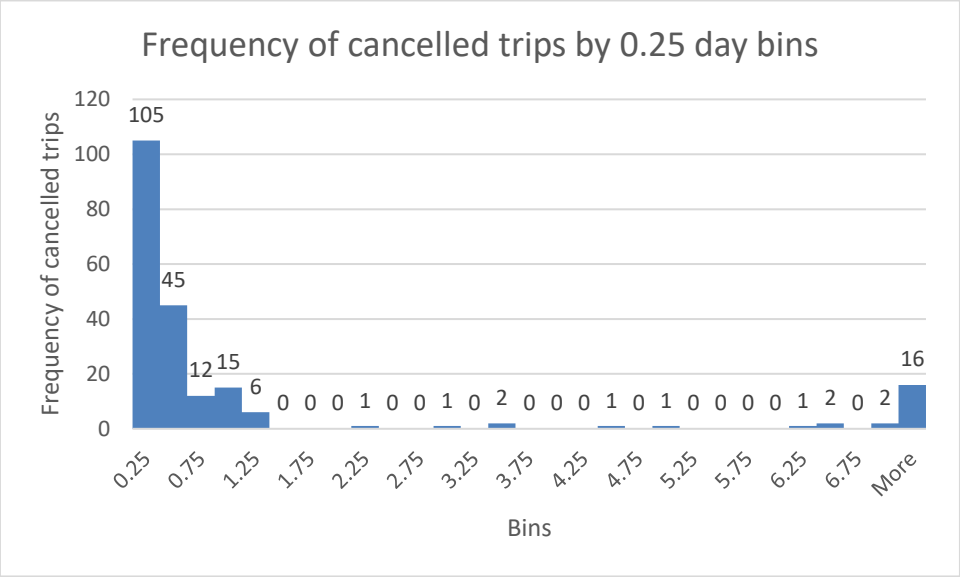
Other than improving efficiency, IndoCabs needs to streamline its booking mechanisms.

In case there are certain platforms that have been discovered to result in greater cancellations, having a more seamless user experience or requiring more confirmation steps might discourage frivolous bookings. Applying predictive analytics can also be a game-changer, helping IndoCabs anticipate chances of cancellation and act with price changes or availability accordingly. Through the study of past data, they can create models that predict cancellation probability, allowing for proactive steps to reduce disruptions.

Elevator Charts



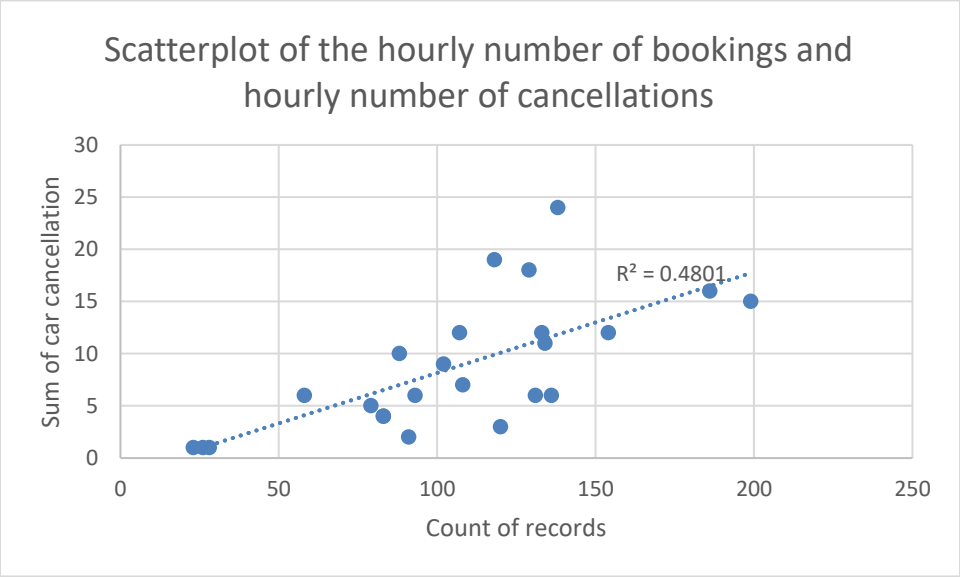
The proportion of cancellations per hour clearly shows that cancellations are not evenly distributed throughout the day, with some peak periods having significantly higher cancellation rates. This is a critically important finding because it suggests that IndoCabs needs to adjust cab availability and have policies to minimize cancellations during such high-risk periods.



The frequency of canceled trips by 0.25-day bins is significant in that it shows cancellations are strongly concentrated among trips booked within the final hours prior to departure. This result justifies the need for IndoCabs to encourage advance bookings through pricing incentives or enforce stricter policies for last-minute bookings. The cancellations vs. bookings scatterplot paints a broader picture, with a moderate positive relationship between cancellations and bookings having an R^2 of 0.48. While there is a correspondence of higher bookings and higher cancellations, the chart suggests other determinants may affect cancellations, possibly the booking channel or category of trip. Taken together, these three charts provide IndoCabs with a solid data-based argument to refine its booking process, optimize cab

management, and reduce cancellations.

The scatterplot of the hourly number of bookings and hourly number if cancellations paint a broader picture, with a moderate positive relationship between cancellations and bookings having an R^2 of 0.48. While there is a correspondence of higher bookings and higher cancellations, the chart suggests other determinants may affect cancellations, possibly the booking channel or category of trip. Taken together, these three charts provide IndoCabs with a solid data-based argument to refine its booking process, optimize cab management, and reduce cancellations.



Below are the two bar charts for the proportion of canceled trips by booking window. The first bar

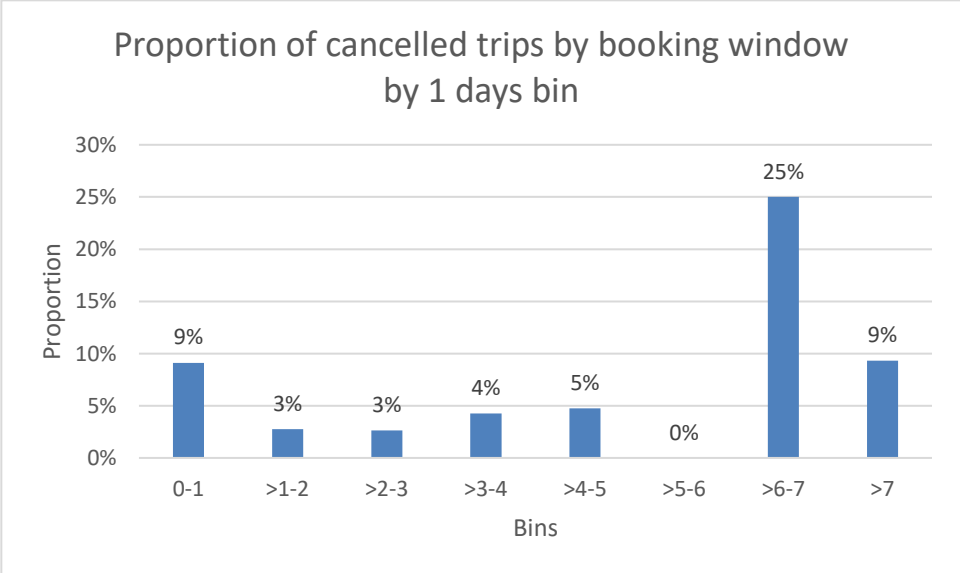
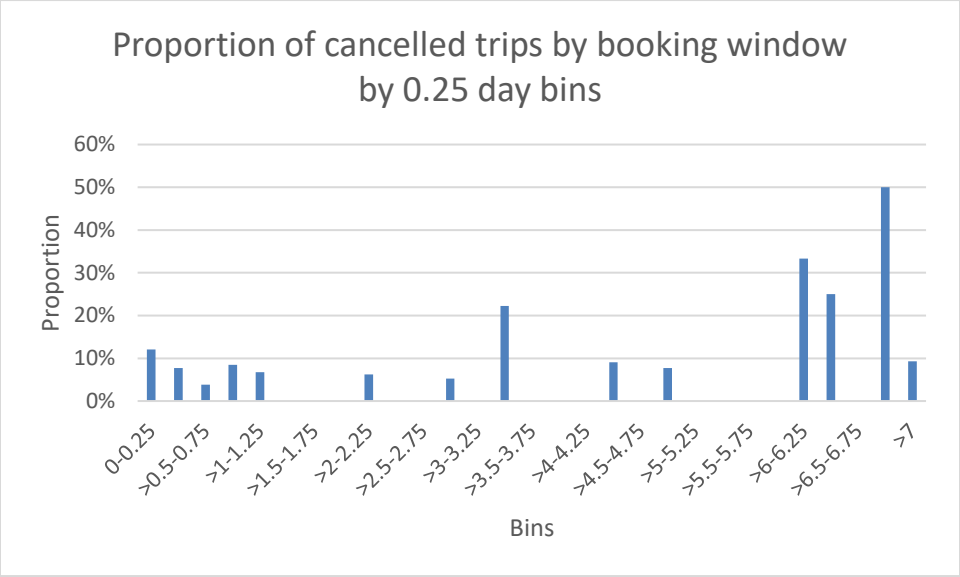


chart will use 1-day booking windows, and the other will use 0.25-day booking windows.



Notes on Data Preparation

The data provided by IndoCabs contained some errors, including travel dates that took place before January 1, 2013, and invalid entries such as years being in the form of 2070 instead of 2013. While my dataset contained no duplicate records, these errors had to be filtered and eliminated to enable proper analysis. Since I deleted wrong dates rather than correcting them based on guidelines, some valuable data may have been lost that could have affected some findings. Furthermore, since my analysis was based on a sample and not based on the entire population data, findings may vary from others working on other samples. Despite these limitations, the cleaned dataset produced insightful trends in booking and cancellation patterns, even though follow-up analyses with other contextual variables may produce higher accuracy.